



Petrology and Geochemistry of Quaternary Mafic Volcanism in the Northern of Lake Van, Eastern Anatolia Collision Zone, Turkey

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Quaternary mafic lavas in the north of Lake Van erupted not only from eruption center like Girekol miniature shield volcano but also from N-S (Yüksektepe volcanic field) and E-W (Ormuktepe volcanic field) extending extensional fractures. Literature K/Ar dates (Lebedev et al., 2010) indicate that the basaltic and hawaiitic lavas erupted in a period between 1.08 and 0.36 Ma. These lavas are composed of olivine, plagioclase, augite and titanomagnetite crystals and display porphyritic to aphyric textures.

Major oxide, trace element and isotopic characteristics of the Quaternary lavas indicate that hawaiitic lavas are the fractionated derivatives of a primitive alkali basaltic magma via fractional crystallization combined with assimilation process. Results of our AFC and EC-AFC models imply that alkali basaltic lavas assimilated negligible crustal material ($\sim 2\%$) in contrast to the hawaiitic lavas that experienced crustal contamination between 3% and 10%. LIL and LRE elements of the most primitive lavas display enrichments relative to HFS elements on N-MORB-normalized spidergrams while their lead isotopic ratios exhibit trends heading towards the EM2 type mantle, implying the importance of a distinct subduction component in the source.

To evaluate partial melting processes in mantle source region of the Quaternary mafic volcanism, we conducted partial melting models. Results of our models suggest the presence of both garnet and spinel peridotite as the sources material with a partial melting degree $\sim 5\%$ and mixing of the derivative melts from them in the genesis of the mafic alkaline lavas.